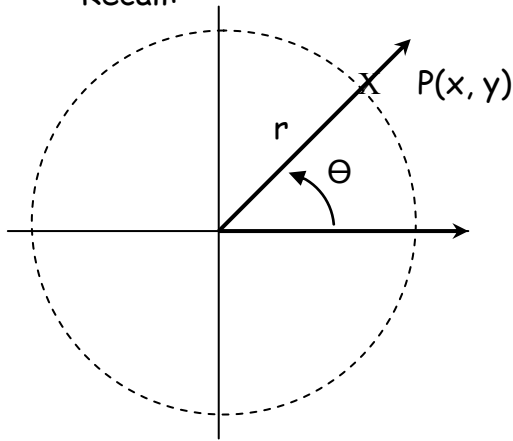


The CAST Rule

Part A: Review

How are we able to evaluate the sine of 225° if 225° cannot be the corner of a triangle? The **Standard Position** of angles allows us to define trigonometric ratios for ANY angle.

Recall:



To find the trig ratios for θ , pick a point $P(x, y)$ on the terminal arm. Drop a vertical line to the x-axis to construct a right triangle.

$$\sin \theta =$$

$$\cos \theta =$$

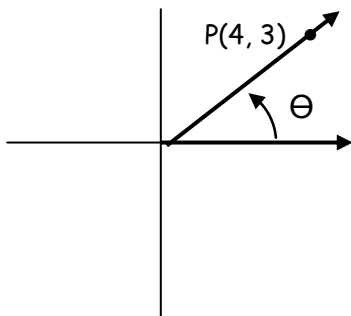
$$\tan \theta =$$

Part B: Investigation

For each diagram below...

- Construct a right triangle by dropping a perpendicular from P to the x-axis.
- Determine the 'lengths' of all three sides of the right triangle constructed, including whether the 'length' is positive or negative.
- Determine the three primary trig ratios, sine, cosine and tangent. (NOTE: some of these trig ratios WILL be negative)
- Determine θ in degrees.

QUADRANT 1

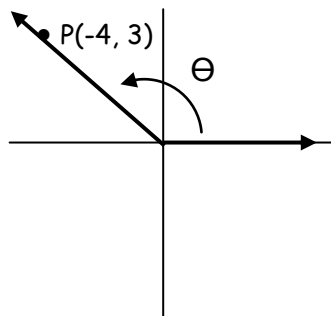


$$\sin \theta =$$

$$\cos \theta =$$

$$\tan \theta =$$

QUADRANT 2

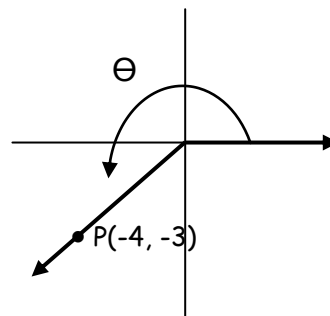


$$\sin \theta =$$

$$\cos \theta =$$

$$\tan \theta =$$

QUADRANT 3

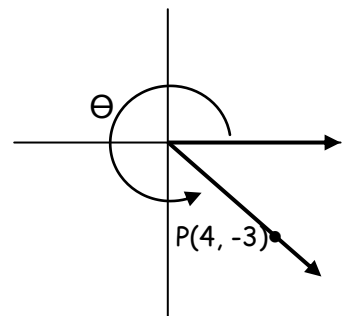


$$\sin \theta =$$

$$\cos \theta =$$

$$\tan \theta =$$

QUADRANT 4



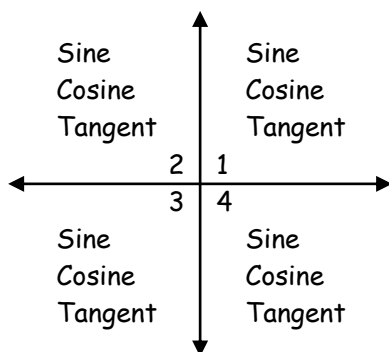
$$\sin \theta =$$

$$\cos \theta =$$

$$\tan \theta =$$

Part C: Summary of Investigation

- Look very carefully at the signs of your trig ratios in each quadrant.
- In the following quadrant system indicate whether the trig ratio was positive (+) or negative (-) for the four different quadrants investigated above.
- Highlight those trig ratios that are positive.



- If we start in the fourth quadrant and read counter-clockwise we see that **Cosine**, **All** ratios, **Sine**, and **Tangent** are the positive ratios. This is referred to as the **CAST** rule. Label the quadrants above with the letters **C-A-S-T** appropriately.

Examples:

Complete the following chart for the trig ratios listed in the top row. You will have to use your knowledge of SPECIAL ANGLES.

Trig Ratio	$\cos 120^\circ$	$\sin 150^\circ$	$\tan 240^\circ$	$\sin 315^\circ$
Positive or Negative?				
Standard Position of Angle ⇒ Construct right triangle ⇒ Determine acute angle formed by terminal arm and x-axis				
Exact Value of Trig Ratio				